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MODEL GP-5U(C,E,K)

PORTABLE COLOR CAMERA

OPERATION MANUAL

Hitachi Denshi, Ltd.

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NOTE: The model and serial numbers of your Portable Color Camera and Power Adaptor are important for you to keep for your convenience and protection. These numbers appear on the nameplate located on the rear panel of the products. Please record these numbers in the spaces provided below, and retain this manual for future reference.

Model No. _____ Serial No. _____

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

MODEL GP-5U(C,E,K)
PORTABLE COLOR CAMERA

1. INTRODUCTION

The Hitachi GP-5 is a portable color camera employing a specially designed tri-electrode vidicon tube. The vidicon tube functions to convert the light from the subject as it is focused by the lens into an electrical signal for recording on a VTR or display on a monitor. Due to its high precision nature, ample care is required in the operation, transportation and storage of this color camera in order to ensure long term reliable performance.

There are two types of GP-5 available: standard and de luxe. The standard type is equipped with a standard lens and the de luxe type with a zoom lens.

2. OPERATING CAUTIONS

1. Avoid locations with fire or explosion hazard

   Do not use the GP-5 in locations such as gasoline filling stations, etc., where there is risk of fire or explosion.

2. Avoid extremes in temperature and humidity

   Picture quality can be impaired or camera damaged by extremes in temperature (below -10°C or above +40°C) and humidity. Avoid use or storage in locations subject to these conditions.

   Use particular care not to place camera in direct sunlight or in such locations as automobile dashboards where it can become overheated.

   Also note that if camera is taken suddenly from a cold environment such as outdoors during winter into a warm location, internal condensation may form.

3. Do not expose to rain or water

   This camera is not waterproof. Do not use it in rain or place it where it can become wet. Internal moisture can lead to malfunction or damage.

4. Avoid dusty environments

   Contamination by dust or grit can lead to internal damage. Avoid using or storing the camera where it is subjected to these conditions.

5. Protect from vibration and shock

   Use or storage in locations where camera is subjected to vibration or shock can impair performance and lead to damage.

6. Keep away from strong electrical or magnetic fields

   Picture distortion, noise and other adverse effects can occur if camera is used or stored in vicinity of strong magnetic or electrical fields. Avoid such locations as near TV and radio broadcast antennas, motors, transformers and directly adjacent to TV receivers.

7. Do not point toward strong light

   Regardless of whether power is on or off, do not point camera lens toward the sun or other strong light source.

The residual image of such a source can become burned into the pickup tube. When not using the camera, be sure to turn off power and close the lens iris (set to "C").

8. Avoid pickup of extremely bright subject within dark surroundings

Long period still pickup of a subject with very bright portions within an overall dark scene can cause a residual image to remain on the pickup tube.

9. Do not touch pickup tube

When lens is removed, use caution not to touch glass faceplate of pickup tube.

10. Do not open camera

Since high voltage circuits are contained, opening the camera and electronic viewfinder poses both a shock hazard and risk of damage. Refer all service to a qualified service agency.

11. Keep foreign objects out of camera

Use care that metallic objects, moisture and other foreign materials do not enter camera interior. These present both a shock hazard and risk of damage.

12. Do not drop or expose to vibration

Avoid dropping the camera or power adaptor or exposing these units to vibration. Particularly when the lens section of the camera is pointed downward, vibration and shock can cause damage to the pickup tube.
Be sure to use carrying case (option) when carrying the camera.

13. Install replacement lens correctly

When changing camera lenses, perform carefully to ensure that lens threads are properly engaged.

14. Operate carefully

An entire system usually consists of camera, power adoptor AP-5 and VTR. When setting up equipment, observe that all connections are performed properly. Afterwards, handle and operate equipment carefully to avoid stress on connector couplings.

15. Place power adaptor on firm support

Be sure to place power adaptor where risk of dropping is absent.

16. Close lens iris after using

After using the camera, disconnect power adaptor from AC outlet and close lens iris (set to "C").

17. Use only accessory power adaptor, AP-5.

AP-5 is specially designed for use with this camera. Connection to other types of power supplies can cause malfunction or damage.

18. To clear dust from lens and pickup tube

If dust should adhere to lens or pickup tube face, disconnect power adaptor from AC outlet. Use rubber bulb type blower or lens brush to gently clean lens and pickup tube.

19. Hue of the picture may change for some

time if camera is panned or tilted suddenly during operation. This is an effect of terrestial magnetism, not camera trouble.

20. Do not wind power cord, camera cable and VTR cable around camera body for long period to avoid possible damage to camera enclosure.

21. Remove power cord, camera cable and VTR cable by handling the plug.

22. Do not use volatile solvent such as benzine, thinner, alcohole, etc. when cleaning camera case to avoid deformation of case or removal of painting.

In Event of Difficulty

In event of sudden loss of picture or other malfunction, immediately disconnect power adaptor from AC outlet. Contact Hitachi Denshi dealer or service agency for service.
Prolonged operation while camera is functioning abnormally or tampering with the camera intrior can extend the severity of the difficulty.

3. FEATURES

1. Compact and lightweight

   Since camera control unit (CCU) is not required, the bulk of camera is only 2.6 liters and weight together with standard lens and grip is only 2.2 kg.

2. Faithful color reproduction

   Advanced 3-electrode type pickup tube provides faithful reproduction of subject color hues.

3. Low power consumption

   Even with electronic viewfinder installed, power consumption is only 10.8W (12VDC 900 mA).

4. Easy operation

   Built-in automatic sensitivity control (ASC) circuit allows simple operation consisting of only adjusting side panel presets and lens.

5. Capable of self-contained operation

   Completely self-contained operation can be performed in combination with a portable VTR with power supplied from the VTR (DC +12V).

6. Electronic viewfinder

   The electronic viewfinder can be used as a return-video monitor of a video deck.

4. DESCRIPTION OF PARTS

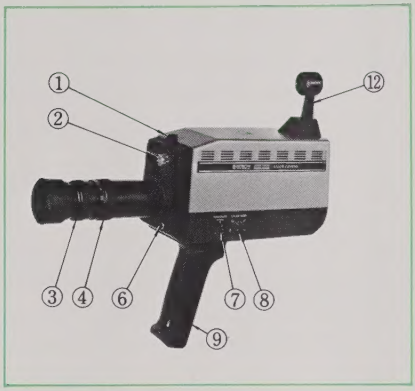


Fig. 1 Camera (Standard type)

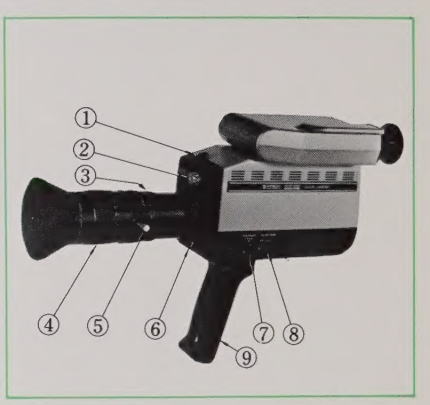


Fig.2 Camera (De luxe type)

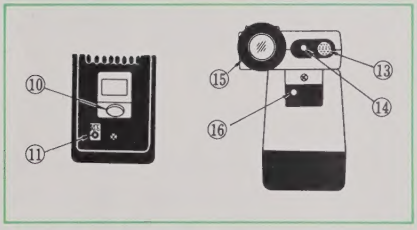


Fig. 3 Rear and Bottom View

① Aperture indicator

Flickers when lighting is insufficient.

② Microphone

Employ for sound pickup.

③ Iris ring

Adjusts iris.

④ Focus ring

Adjust focus

⑤ Zoom ring

⑥ Remote control switch

When used in combination with VTR provided with remote pause control function, this switch provides convenient start and stop operations. Recording starts when switch is depressed to start position, and REMOTE PAUSE lamp ⑯ lights. Recording stops when it is again depressed and REMOTE PAUSE lamp extinguishes.

Note that special cable (option) is required for this switch function.

⑦ Contrast control (CONTRAST)

Adjusts brightness contrast.

Normally set to NORMAL position.

⑧ Color temperature control (COLOR TEMP)

Adjusts hue according to subject lighting conditions, i.e., outdoors (clear, cloudy) or indoors (type of lighting equipment).

⑨ Grip

Remove when mounting camera on tripod.

⑩ Camera connector

Connect camera cable.
Length approx. 3 meters (10 ft).

⑪ External microphone jack [EXT MIC]

When external microphone is connected, audio line output becomes switched from built-in to external microphone.

⑫ Optical viewfinder

Employ for framing the scene.

⑬ Speaker

Used for monitoring played back sounds.

⑭ Video selector switch and sound volume control

Televising scene can be displayed on viewfinder by pressing this switch.
Pictures and sound recorded on VTR can be monitored by pulling this switch. In this condition, this switch functions to adjust sound volume.

⑮ Eyecap and viewfinder

Close eyecap in bright outdoors. Open it in room.
A black and white picture is displayed on a 1.5-inch CRT.

⑯ VTR start lamp (REMOTE PAUSE)

Lights when remote control switch is in ON position.

*⑤ ⑬ ⑭ ⑮ is de luxe type only.
⑫ is standard type only.

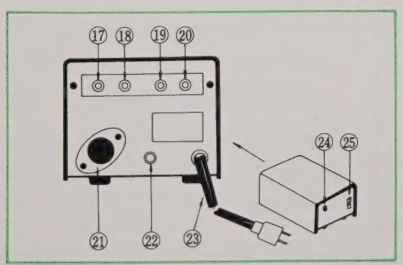


Fig. 4 Power Adaptor

⑰ Camera VIDEO output (CAMERA OUT (VIDEO))

Connector for camera video output signal.
Connect to video input of VTR.

⑱ Camera AUDIO output (CAMERA OUT (AUDIO))

Connector for microphone output.
Built-in microphone amplifier provides -20dB high impedance output. Output becomes switched to external microphone when external microphone is connected.

⑲ RET INPUT (RET. INPUT (VIDEO))

To employ this function, install electronic viewfinder (option) and connect VTR playback output to this connector. VTR playback picture can then be viewed on viewfinder screen.

⑳ RET INPUT (RET. INPUT (AUDIO))

To employ this function, install electronic viewfinder (option) and connect VTR playback output to this connector. VTR playback sound can then be monitored.

㉑ Camera connector (CAMERA)

Use camera cable to connect camera to this connector.

㉒ Remote control (REMOTE)

If VTR is provided with remote control function, connect VTR remote control switch output to this connector.

㉓ Power cord

Connect to household AC power source.

㉔ Pilot lamp

Lights to indicate when power is ON.

㉕ Power switch (POWER)

Set to upper ON position to turn on power. Turn power off by setting to lower OFF position.

5. CONNECTIONS

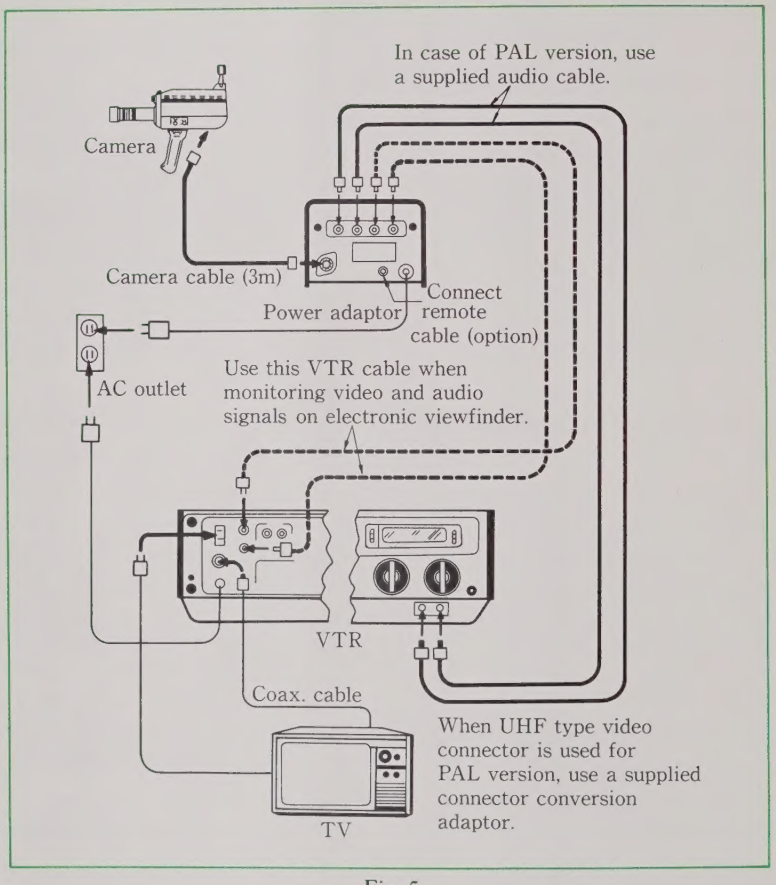

In case of PAL version, use a supplied audio cable.
Camera
Camera cable (3m)
Power adaptor
Connect remote cable (option)
AC outlet
Use this VTR cable when monitoring video and audio signals on electronic viewfinder.
VTR
Coax. cable
When UHF type video connector is used for PAL version, use a supplied connector conversion adaptor.
TV

Fig. 5

1. Connect camera cable to CAMERA
   * Align grooves and insert connector.
   * Set cable into groove provided in grip.
   * Secure with cable clamp.
2. Connect camera cable to power adaptor.
3. Connect CAMERA OUT VIDEO connector of power adaptor to VIDEO input connector of VTR.
4. Connect CAMERA OUT AUDIO connector of power adaptor to AUDIO input connector of VTR.
5. Connect RET. INPUT VIDEO connector of power adaptor to VIDEO output connector of VTR.
6. Connect RET. INPUT AUDIO connector of power adaptor to AUDIO output connector of VTR.
   * Since connecting cords for video and audio use the same VTR cable, use care to connect properly.
   * Use RET. INPUT VIDEO and AUDIO connectors when monitoring video and audio signals on electronic viewfinder.
7. Connect power cords of power adaptor and VTR to AC outlets.

6. OPERATION

Operation with VTR and TV Receiver

Be sure to read operation manuals of VTR (video deck) and TV receiver.

***VTR Operation**

1. Set input selector switch to camera position.
2. Set antenna switch to RF.
3. Turn on VTR power and set for recording mode.

***TV Receiver Operation**

1. Connect RF output of VTR to VHF antenna input of TV receiver.
2. Turn on power of TV receiver and set channel selector to channel employed by VTR RF output.

*Feedback howling can be caused if camera is brought in proximity to color TV receiver. In this case, reduce TV receiver volume.

***Camera Operation**

1. Connect camera, camera cable, VTR cable and power supply adaptor as described in CONNECTIONS. Set power switch of power adaptor to ON.

   * Push video selector switch on electronic viewfinder. Turn sound volume control fully counterclockwise except when monitoring playback sound.

2. Obtain optimum picture frame, viewing monitor screen.

   * When optical viewfinder is used, use bright frame as a guidance. Actual picture is a little larger than the bright frame. Also actual picture angle differ from bright frame according to subject distance. Both of them coincide each other at the distance of 3 m.

3. Adjust iris by iris ring. Optimum iris is obtained by position where aperture indicator changes from flickering condition to lighting condition. Set iris to open in indoor and to 5.6 in outdoors.
4. Turn lens focus ring and adjust while observing display on Elecronic Viewfinder or TV receiver. In cases when focus cannot be performed with reference to monitor, adjust focus ring according to subject distance.
5. Set COLOR TEMP control according to type of subject illumination.
6. Ordinarily, use with CONTRAST control at NORMAL position.
7. Connect (optional) remote control cable only, then VTR is capable of remote control operation.

Note: Standard lens or zoom lens (6×) is supplied with this camera.
Other types of lenses, even though 1-inch "C" mount, may not be compatible with this camera. Consult Hitachi Denshi dealer for recommended interchangeable lenses.

Iris Adjustments

1. If aperture indicator flickers even with iris fully open, insufficient light is indicated. Additional lighting is then required.
2. Automatic sensitivity control (ASC) circuit incorporated in this camera allows operation without adjustments over a wide range of subject illumination.
   Set lens iris to F2 in ordinary room and F5.6 in bright outdoors. When aperture indicator is flickering, open lens iris wider or increase illumination.

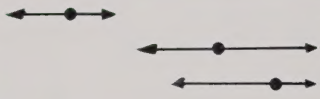
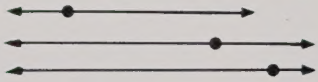
Zoom Adjustment

1. Obtain optimum picture frame by zooming lever.
2. Optimum focus is obtained by focusing the picture at minimum distance.

Focus Adjustments

1. When video monitor used, Adjust focus while observing the display.
2. In situations where reference to color TV receiver display is not possible, adjust lens focus ring according to distance to subject.
3. Range in which subject is in focus (depth of field) varies according to lens iris (F value) and focal distance.
   This property can be employed for easily adjusting focus.
4. Stopping down iris (increasing F value) increases depth of field.
5. Short focul length (wide angle) lens possesses wide depth of field.

Relationship between focus and lens iris

Focal Length	Iris	(values when focus ring is adjusted.) Focusing Range 0.7m 1 1.5 3 7 ∞	Notes
Standard lens, f = 25mm	F2		Distance to subject must be obtained as accurately as possible
	F5.6		According to subject distance, focus can be obtained by setting focus ring to 1m, 2m or infinity.
	F16		By setting focus ring to 5m, focus becomes obtained from 1m to infinity.

COLOR TEMP Adjustment

The human eye possesses an adaptability with respect to light in that an object which appears white under indoor illumination also appears white when viewed outdoors. However, a camera does not possess this adaptability and with the same conditions would tend toward a reddish or bluish response. Color temperature adjustmenets are performed in order to compensate for this effect.

Fig. 6

Color Temp. Control Setting	Scene Location	Adjustment	Approx. Color Temp.
	Indoors with halogen or tungsten lamp illumination	Set control to mark.	3,000 – 3,200°K
	Indoors with white fluorescent illumination.	Set control to mark. If illumination is a mixture of fluorescent and halogen (or tungsten) set control between mark and mark.	4,500°K
	Outdoors, clear sky	Set control to mark. If subject is in shadow, set control to mark for more precise colors.	6,000°K
	Outdoors, cloudy indoors, daylight flourescent illumination	Set control to mark.	9,000–10,000°K

Ordinarily, setting the control to the positions recommended in the above table is sufficient. In some cases of mixed lighting, however, it may be difficult to determine the color temperature. In these cases, more precise adjustment can be obtained by observing picture on color monitor. Adjustment can be performed easily when human complexion or white color is used.

CONTRAST Adjustment

In particularly dark locations or in such applications as telecine, adjustment of this control can provide a more easily viewed picture.

Color Position	Application
NORMAL	In such applications as 8mm telecine, dark portions of scene may become enhanced and contrast reduced. While observing display on color TV receiver, turn control counter-clockwise from NORMAL position and set to suitable position.
NORMAL	NORMAL position of control is adequate for nearly all applications.
NORMAL	If aperture indicator flickers even with lens iris fully open (F =2.0) and adequate picture quality cannot be obtained, turn control clockwise from NORMAL position and while observing display on color TV receiver, set to suitable position.

How to Monitor Playback Audio and Video Signal on Electronic Viewfinder

1. Pull video selector switch on electronic viewfinder.
2. Set VTR in Playback mode. Then playback picture is displayed on electronic viewfinder.
3. Turning sound volume control clockwise will increase playback sound from speaker on electronic viewfinder.

* Be sure that selector switch is depressed to camera position during scene pickup. If in released position without a signal from the VTR, noise can become recorded on the tape.
* If playback sound is also reproduced by VTR, feedback howling can occur if viewfinder volume control is set to high.

Mounting on Tripod

1. Remove grip from camera.
2. Be sure to employ a sturdy tripod. Avoid compact tripods designed for film cameras, since they are unstable.
3. Secure camera firmly and confirm absence of wobble.

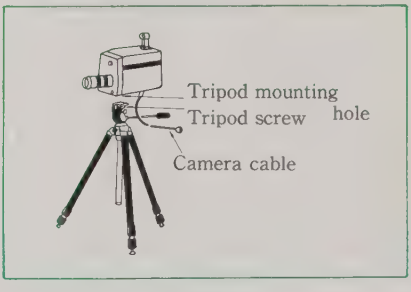


Fig. 7

Subject Brightness and Illumination

Proper subject brightness is required in order to obtain impressive color pictures.

The color camera GP-5 is designed for optimum performance with 2,000 lux illumination, 60% reflectivity and 3,000°K color temperature. Observe aperture indicator to determine if suitable amount of light is being provided to camera.
Open lens iris 2 or 3 stop wider from where indicator changes from flickering to steady lighting. When color monitor is available, adjust white observing the display.

*Although 2,000 lux is standard, adequate performance can be obtained with illumination above 200 lux. Below 200 lux, illumination becomes insufficient and picture darkens.
With illumination above 100,000 lux, an ND filter becomes required for reducing amount of light.

7. SPECIFICATIONS

Camera and Power Adaptor

Color System	(U, C): NTSC (E, K): Simplified PAL
Pickup System	Single 3-electrode pickup tube
Pickup Tube	HS251, 1-inch vidicon or equivalent
Sync System	Internal
Scanning Lines	(U, C): 525 lines 2 : 1 interlace (E, K): 625 lines 2 : 1 interlace
Horizontal Frequency	(U, C): 15.734 kHz (E, K): 15.625 kHz
Vertical Frequency	(U, C): 59.94 Hz (E, K): 50 Hz
Video Output	1 Vp-p 75Ω (unbalanced)
S/N	More than 40 dB
Standard Subject Illumination	2,000 lux
Minimum Illumination Required	100 lux (F2)
Microphone	Electret condenser microphone
Usable External Microphone	-67 dB low impedance
Audio Line Output	-20 dB high impedance
Ret. Input Video Ret. Input Audio	1Vp-p/75Ω unbalanced 0dB/10kΩ unbalanced
Color Temperature Selection	Manual adjustment. (tungsten lamp from cloudy outdoors)

Tripod Mount		1/4 inch UNC
Ambient Temperature		-10 to +40°C
Power Supply		(U, C) 120 VAC 60 Hz (E) 220 VAC 50 Hz (K) 240 VAC 50 Hz
Power Consumption		25W (including GM-1)
External Dimensions and Weight	Camera	91 (W) x 346 (H) x 379 (D) mm 2.2kg (including optical viewfinder, standard lens and grip) 110 (W) x 324 (H) x 452 (D) mm 3.2kg (including electronic viewfinder, zoom lens and grip)
	Power Adaptor	85 (W) x 72 (H) x 137 (D) mm 1.3kg

Lens

(1)	Standard Lens	F2, f = 25 mm (C mount)
(2)	Zoom Lens	6x, F2, f = 17–102 (C mount)

Viewfinder

(1) Optical Viewfinder

(2) Electronic Viewfinder

CRT	1.5 inch (40CB4 or equivalent)
Speaker	0.1W 8 Ω(approx. 3 cm)
Eyecap	Open and close type

Supplied Accessories

Items	Composition		
	Surveillance use	Standard	De luxe
Standard Lens, C25SL		○	
Zoom Lens, V6 x 17			○
Optical Viewfinder, LO-1		○	
Electronic Viewfinder, GM-1			○
Grip, GR-1		○	○
Wind Screen		○	○
Camera Cable, C301CN, 3m	○	○	○
VTR Cable, 2m	1 pc.	2 pcs.	4 pcs.
Connector Conversion Adaptor (M-US)	1 pc.*	1 pc.*	2 pcs.*
Plug Conversion Adaptor (3.5φ–US)		1 pcs *	2 pcs. *
Power Adaptor, AP- 5	○	○	○
Audio Cable		○*	○*
Operation Manual	○	○	○

*PAL type only

Optional Accessories

Electronic Viewfinder	GM-1
Zoom Lens	V6 x 17 (6x, F2)
Carrying Case	CL-5
Extension Camera Cable	10m, C102 CA
Remote Control Cable	2m, C201 RA

* These specifications are subject to change without notice.

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